THE CLEAN ENVIRONMENT COMMISSION

Manitoba
Environment and
Workplace Safety
and Health

MG 912

REPORT ON HEARINGS

WESTLAKE REGIONAL WATER SUPPLY PROPOSAL

THE CLEAN ENVIRONMENT COMMISSION

JULY 25, 1989

WESTLAKE REGIONAL WATER SUPPLY PROPOSAL

TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
The Proposed Project	1
PUBLIC PARTICIPATION AND HEARINGS	3
Position of the Proponent - MWSB & PFRA	3
Mr. Erv Griffin	3
Mr. Stan Rainkie	5
Development of the Westlake Proposal	5
Mr. Elliott Allison	5
The Hummerston Proposal	8
Hydrogeologic Analysis	14
Mr. Frank Render	14
Mr. C. MacInnes	16
Water Licencing	17
Mr. Dan Sie, Water Resources Branch	17
Position of the Area Residents	17
CARBERRY HEARING PARTICIPANTS	
Mrs. Darlene Perrett	18
Mrs. Jeanette Henderson	18
Mr. Graham Henderson	18
Councillor Stuart Briese	19
Mr. William Burch	19
Mr. Charles Turner	19
Mrs. Eileen Downey	19
Mr. Ralph Oliver	20
Mr. Art Sear	21
Mr. Tom Baron	21
Mr. Mel Chambers	22
Mrs. Shirley Witherspoon	22
Mr. Allan Reynolds	23
Mr. Peter Hunter	23
Mr. H.R. Bjarnarson	23
Mr. Ken Mitchell	23
GLADSTONE HEARING PARTICIPANTS	
Mr. Stan Rainkie	24
Mrs. Catherine Mowat	25
Mr. Brian Crammond	25
Mayor Stephanie Karaz	25
Mr. Don Smith	26
Mr. Bruno Tonn	26
Mr. Harold Flatt	26
Mrs. Norah Turner	26
Provincial Departments	26
Mr. Larry Strachan	26
Dr. N.S. Rihal	27

WESTLAKE REGIONAL WATER SUPPLY PROPOSAL

TABLE OF CONTENTS

	PAGE
DISCUSSION AND CONCLUSIONS	28
RECOMMENDATIONS	32

FIGURES

Figure 1 - Westlake Project	2
Figure 2 - Assiniboine Delta Aquifer Location	4
Figure 3 - Water Supply Alternatives	6
Figure 4 - Hummerston Well Field Location Plan	9
Figure 5 - Hummerston Area Drawdown From Pumping 568 US.g.p.m. for 20 years	10
Figure 6 - Hummerston Area Whitemud Sub-Basins	11

LIST OF APPENDICES

Appendix A - List of Exhibits From the Town of Carberry Hearing

Appendix B - List of Exhibits From the Town of Gladstone Hearing

WESTLAKE REGIONAL WATER SUPPLY PROPOSAL

INTRODUCTION

On April 19, 1989 Manitoba Water Services Board (MWSB) applied to the Environment Department pursuant to the Environment Act for the development of the Westlake Regional Water Supply System. A licence under the Environment Act was required because the project qualifies as a Class 2 development under Manitoba Regulation 164/88 of the Environment Act. A Class 2 development by definition is a development, the effects of which are primarily unrelated to pollution.

On May 15, 1989, the Honourable Glen Cummings, Minister of the Environment requested the Clean Environment Commission to hold public hearings during the week of June 5, 1989 for the purpose of soliciting public input concerning the potential impacts of the project and to provide him with recommendations regarding the control or elimination of any adverse impacts which the Commission concludes will result from the project.

Copies of the Westlake Regional Water Supply Proposal Environment Impact Assessment (EIA) were received on May 29, 1989 from the Prairie Farm Rehabilitation Administration (PFRA).

Both the Assiniboine Delta Aquifer protection group and the group representing the Westlake Water Supply proposal were quite well informed. During the week prior to the hearing, 3 well attended open houses were held by the proponent that not only explained the proposal but also examined its environmental implications.. Afternoon and evening open houses were held at Carberry, Neepawa and Gladstone. Copies of the EIA were available to those in attendance. In addition, several public meetings were held in the fall of 1988 to explore the issue surrounding the water supply proposal. Over 300 people attended a public meeting in Carberry in October 1988. Since August of 1988, in excess of 50 articles have appeared in newspapers serving both the area covering the aquifer and that of the proposed water supply users.

The Clean Environment Commission's hearings were held in Carberry during the evening of June 7th and continuing throughout the day on June 8th. The hearing was then reconvened in Gladstone on the evening of June 8, 1989, terminating late that night. Clean Environment Commissioners present for the hearing sessions were Mr. Stan Eagleton, Chairperson, Mr. Maurice Blanchard, Mr. Ed Gramiak, Ms. Elizabeth Pawlicki, and Mrs. Joan Vestby.

The Proposed Project

The Westlake Regional Water Supply Proposal has been developed and proposed to be implemented by MWSB and PFRA to provide a water supply with an assured quality and quantity to the Westlake Area (figure 1). The project includes a water source, treatment and storage facilities and a pipeline system to provide a water supply to the Town of Gladstone, and the Villages of Plumas and Glenella as well as 700 farmsteads serviced both by direct pipeline

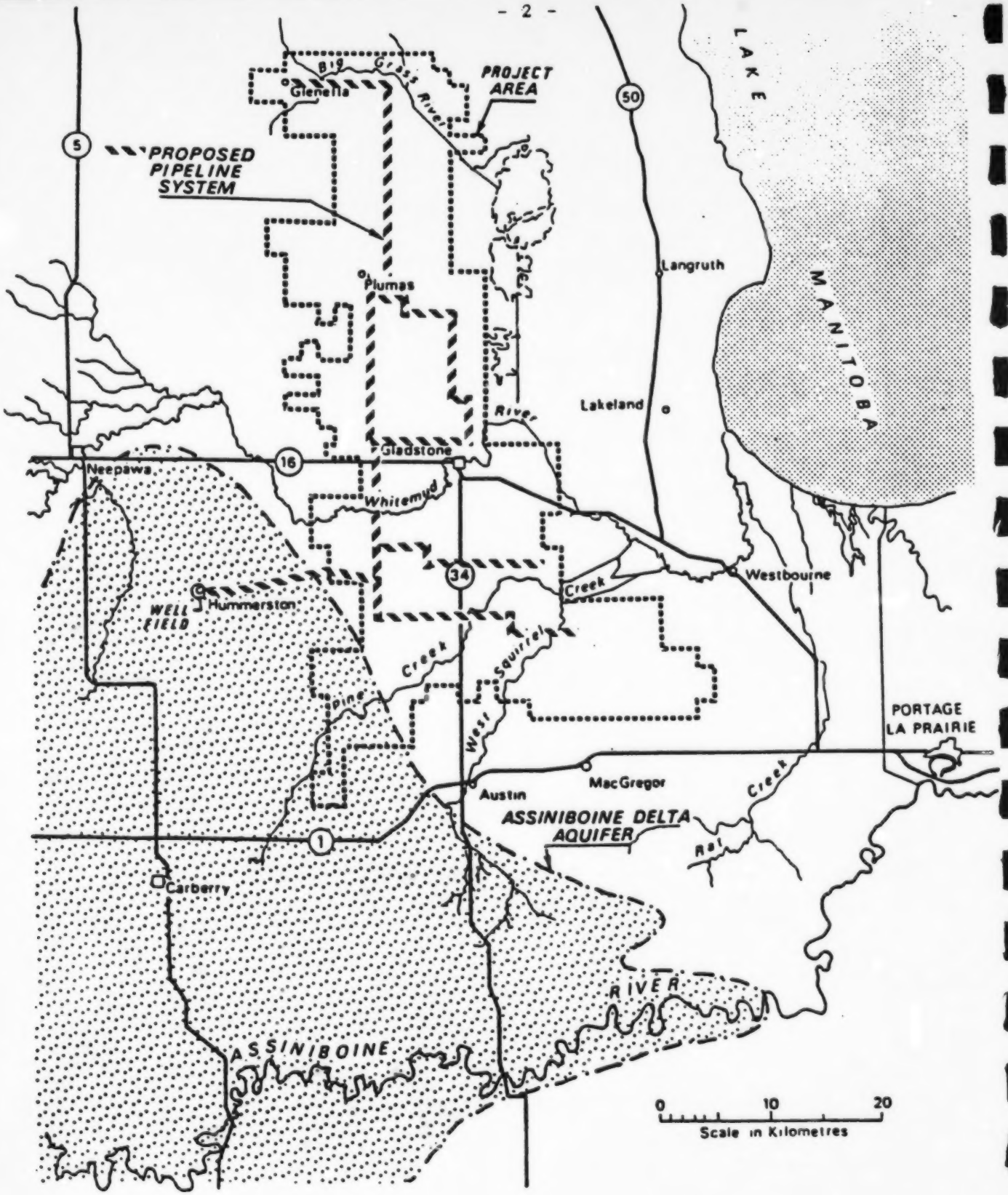


FIGURE ONE
WESTLAKE PROJECT

INTRODUCTION (continued)

connection and from tank loading facilities. The Westlake Region is drought prone and the water is required to support both domestic and livestock needs, particularly during drought periods.

The water supply source selected by the MWSB and PFRA is a well field consisting of 3 separate wells at 1210m (4000 ft) intervals located outside the Westlake area along the abandoned CNR railway line east Hummerston. The well field would draw water from part of a major Manitoba groundwater resource known as the Assiniboine Delta Aquifer which covers an area of 5180 km^2 (2000 mi^2), centered in Carberry and ranging from Glenboro in the south, Neepawa in the north, Douglas near the western boundary, and Austin on the east side (figure 2). The "Aquifer" is utilized as a water supply source by the communities of Glenboro and Carberry; CFB Shilo; a number of smaller communities located on top of the groundwater, such as Wellwood and Brookdale; the Carnation Foods Co. Ltd. potato processing plant located at Carberry; farm irrigators, who are principally under potato supply contracts with Carnation; potato seed growers; and each and every farmstead and other residences located on the aquifer.

PUBLIC PARTICIPATION AND HEARINGS

As previously noted, Clean Environment Commission hearings took place commencing on the evening of June 7, 1989 and continuing the following day June 8, at Carberry. The hearing reconvened on the evening of June 8, 1989 at Gladstone.

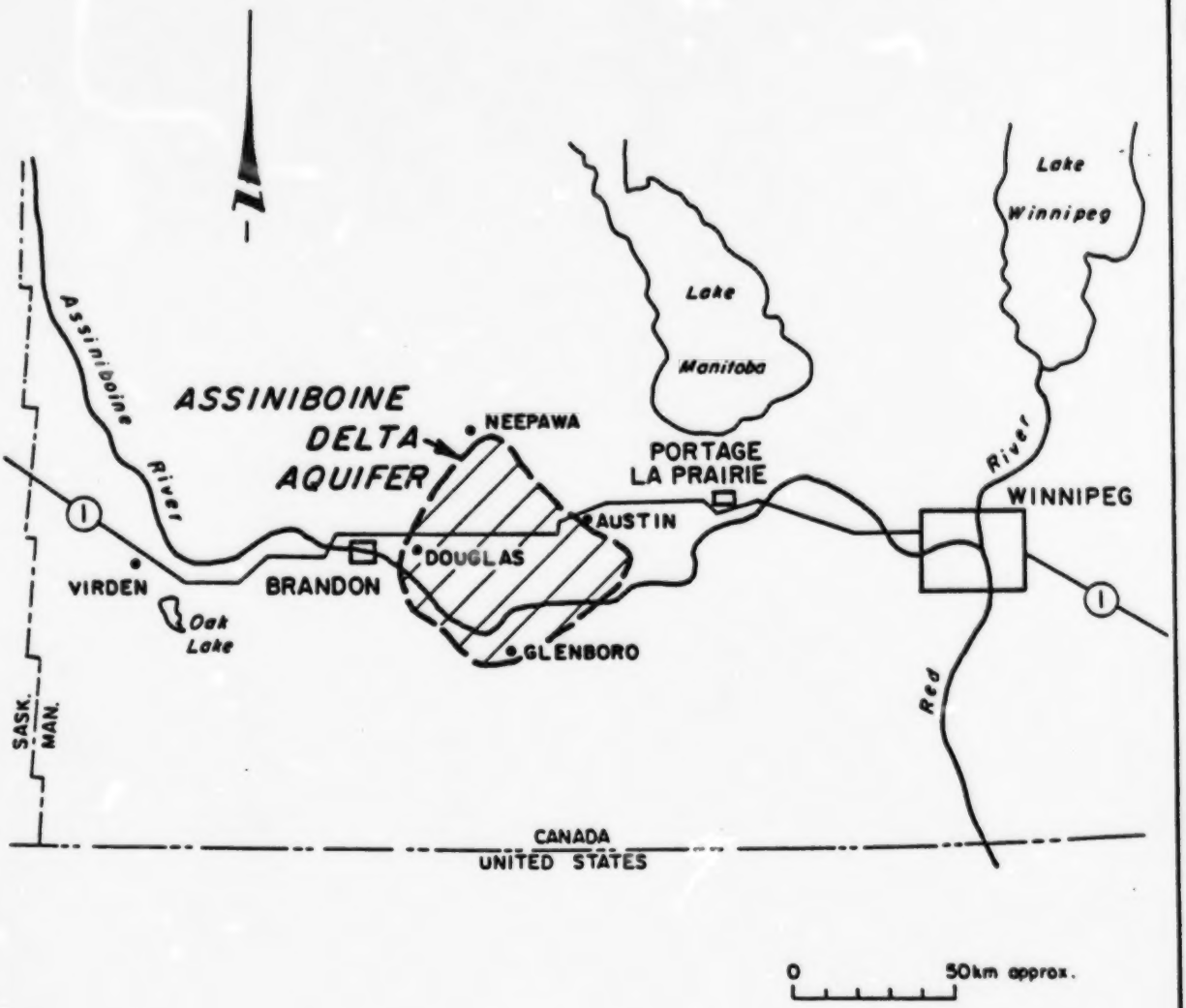
The hearings were well attended with approximately 130 people present at Carberry and over 70 at Gladstone. A reflection of the high level of interest was the large number of people who remained throughout the day at Carberry. A total of 35 briefs were presented at the hearings as well as a number of letters and briefs that were forwarded by mail.

Aside from the proponents, which would include the MWSB, the Manitoba Water Resources Branch of the Manitoba Department of Natural Resources, the PFRA, and the Westlake Water Association, all of the briefs presented at Carberry expressed some reservations concerning the withdrawal of water from the Assiniboine Delta Aquifer to service the needs of the Westlake area. The Gladstone hearing received a mix of presentations but since the location is a part of the Westlake Project, most presentations favored the proposal.

Much questioning by both Commissioners and participating citizens in attendance followed each presentation.

Position of the Proponent - MWSB & PFRA

Mr. Erv Griffin, MWSB General Manager, introduced the proponent's presentation at both Carberry and Gladstone . He noted that the Westlake Regional Water Supply was a proposal developed jointly by PFRA and MWSB. The



Designed	Submitted [signature]	Agriculture Canada	WEST LAKE REGIONAL WATER SUPPLY		
Drawn	Date 11/5/89	Prairie Farm Rehabilitation Administration / Administration du Rétablissement agricole des Prairies	ASSINIBOINE DELTA AQUIFER LOCATION		
Checked	Approved — Director, Engineering Services	Engineering Service	Scale AS SHOWN	Date FEB. 1989	PFRA No. 114238	FIGURE 2.
	Date				

PUBLIC PARTICIPATION & HEARINGS (continued)

proposal had been developed in response to numerous resolutions from both the Rural Municipality (R.M.) of Westbourne and the Town of Gladstone. A study undertaken by PFRA had identified the Westlake area as one of the 3 most drought sensitive areas in Manitoba. Two reconnaissance level studies had identified that a well field in the Assiniboine Delta Aquifer would be the most cost effective and environmentally safe method of providing a drought proof supply of acceptable quality water to the area. Alternative surface water sources for the Westlake area water supply including a dam on Pine Creek at Firdale, a dam site on Spring Creek north east of Neepawa, several dam sites on the Whitemud River between Neepawa and Gladstone, and withdrawal of water from Lake Manitoba were also examined.

Mr. Stan Rainkie, a Councillor with the R.M. of Westbourne and Chairperson of the Westlake Water Association spoke next on behalf of the proponent. He pointed out that Gladstone had a water supply but it was of poor quality. The R.M. of Westbourne, particularly the northern reaches, has limited amounts of water much of which is of poor quality. Many residents of the Plumas area have been hauling water since June, 1988 as a result of the 1988 drought. The Westlake Water Association, like many residents living on the aquifer, believe that the Assiniboine Delta Aquifer must be better managed. The Association fully supports the monitoring and surveillance programs proposed by PFRA as part of their recommendations on the Westlake proposal.

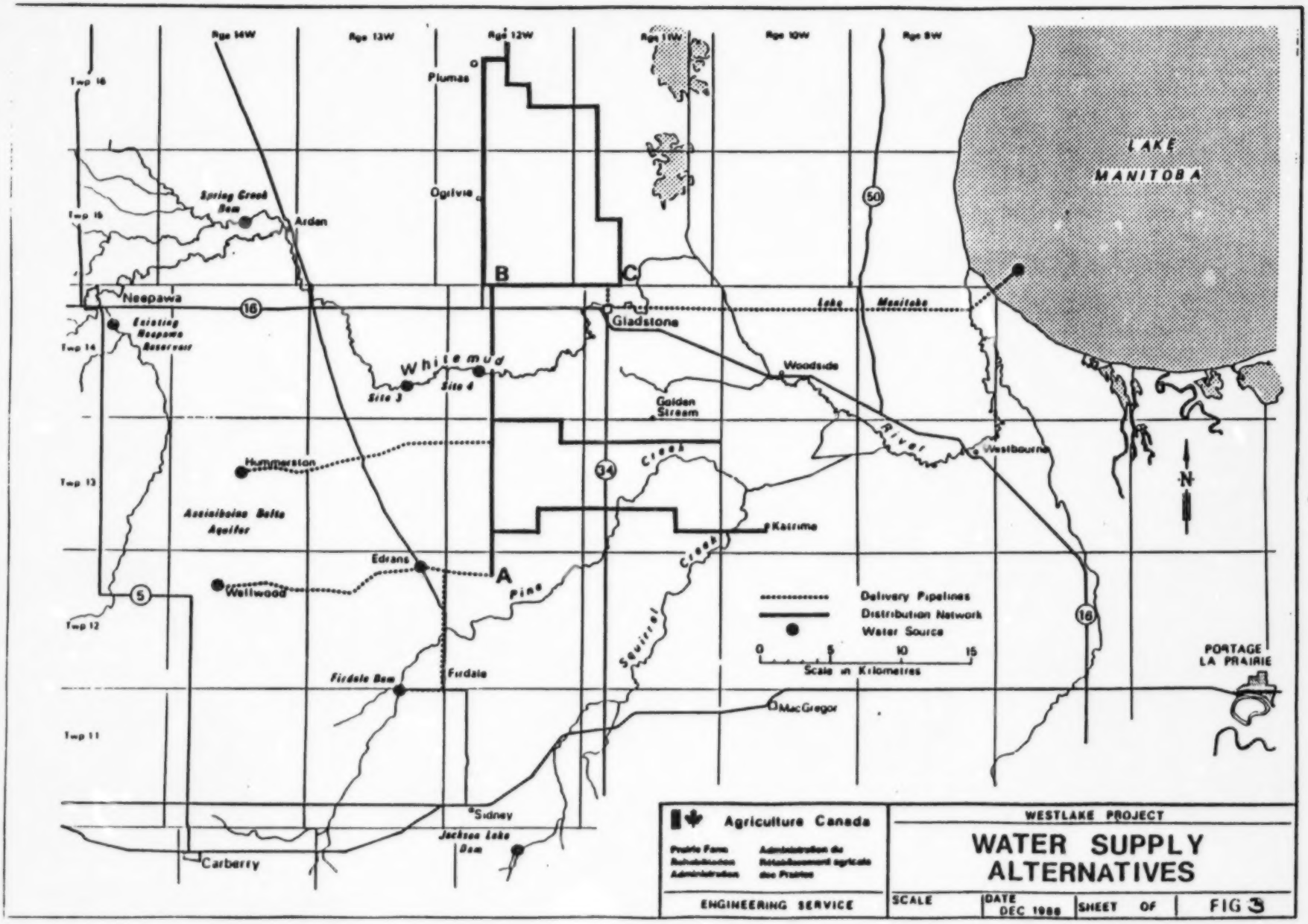
Development of the Westlake Proposal

Mr. Elliott Allison, Environmental Studies Coordinator with P.F.R.A. made the main presentation on behalf of the proponent. He made his full presentation at Carberry and repeated a summary at Gladstone.

Mr. Allison discussed a reconnaissance survey undertaken to examine alternative water supply sources to service the Westlake project (Figure 3). A total of 4 surface water sources as well as 3 separate sites for groundwater, located on the Assiniboine Delta Aquifer, were examined. The surface water sources included Lake Manitoba, Spring Creek, the Whitemud River and Pine Creek. The groundwater withdrawal sites considered were located near Edrans, Wellwood and Hummerston.

In terms of cost, all of the surface water supply developments would supply water at a considerably higher unit cost range than those of the groundwater sources. Capital costs to develop a water supply from any of the surface water sources ranged from $11-13 million dollars. These costs compare with $8-8.8 million dollars to develop the groundwater sources. Higher costs for the surface water sources were associated with the development of dams and/or water intake facilities and more elaborate water treatment.

In the case of the Lake Manitoba supply alternative, the delivery pipeline would be longer than that required to put in place any of the alternate groundwater systems.



Agriculture Canada

Prairie Farm Rehabilitation Administration

Administration du Rétablissement agricole des Prairies

ENGINEERING SERVICE

WESTLAKE PROJECT

WATER SUPPLY ALTERNATIVES

SCALE | DATE DEC 1988 | SHEET OF | FIG 3

PUBLIC PARTICIPATION & HEARINGS (continued)

The groundwater systems also have the benefit of being able to reduce pumping energy requirements because of differences in ground elevation. Hummerston is located at an elevation about 125m (410 ft) above Gladstone whereas Lake Manitoba is approximately 25m (82 ft) below the level of Gladstone.

Both capital and operating costs for the treatment of surface waters are considerably higher. The treatment of surface waters would require the addition of chemicals such as lime, soda ash, coagulants, taste and odor counteractants, and chemicals for disinfection, in a process consisting of coagulation, sedimentation and filtration. In the case of Lake Manitoba water, the mean chloride value approaches 400 mg/l ranging from 250 to 530 mg/l. A maximum acceptable concentration for chloride prescribed by the Canadian Drinking Water Guidelines is 250 mg/l. Chloride cannot be removed by the processes identified but requires a more sophisticated and costly treatment method.

All of the surface water supply sources are subject to the development of taste and odor producing substances which are often difficult to treat. This would be especially true of a water supply source located on Pine Creek at a Firdale Dam site. The organic material associated with vegetation and decaying vegetation in the reservoir would require a number of years to decompose.

Dams and resultant reservoirs would result in the flooding of woodland and agricultural land. There are also downstream impacts when water is withheld by a dam. A dam on the Whitemud River could prevent fish passage; a dam on Pine Creek could reduce valuable deer habitat. Further and extensive engineering studies would also be required in the design of a dam at Firdale. The lead time to construct a surface water system would also be much longer than the development of a groundwater system as a water supply source.

Treatment facilities for a groundwater source from the Assiniboine Delta Aquifer would be much less expensive than for a surface water source. Iron and manganese removal would likely be necessary and regulations require that a disinfectant be added for microbial control. Treatment plant operating costs would also be considerably less.

The Hummerston site was considered more acceptable than either the Wellwood or Edrans sites for well development purposes. The drawdown cone at Hummerston basically impacts a community pasture. The Edrans site contains higher concentrations of iron and manganese which would have to be removed with more difficulty and cost.

The outcome of the reconnaissance studies was that the Assiniboine Delta Aquifer at Hummerston should be investigated in greater detail as the most promising alternative identified.

PUBLIC PARTICIPATION & HEARINGS (continued)

The Hummerston Proposal

Hummerston is located 17 km (11 mi) south east of Neepawa in close proximity to a PFRA community pasture (figure 4).

The maximum daily demand of the Westlake Project was estimated to be 53.6 L/s (708 i g.p.m.) Assuming, however, that part of the water requirements of the region would be satisfied from existing water sources such as dugouts, the average annual pumping rate over a 20 year period was estimated at 35.8 L/s (473 igpm).

Figure 5 illustrates the drawdown cone resulting from pumping from the aquifer at the estimated rate of 35.8 L/s rate for 20 years. This diagram depicts what is expected to be the stabilized drawdown cone. The drawdown cone may enlarge somewhat during a drought year and then shrink during a year with above average precipitation. The drawdown cone encompasses about 4% of the total aquifer land surface area as defined by previous extensive studies of the Assiniboine Delta Aquifer.

As a function of the sustainable yield of the aquifer, Water Resources Branch have estimated that the Westlake proposal would utilize 2% of the estimated total sustainable yield. In the specific aquifer sub-basin in which the well field is located, known as the Lower Whitemud East (figure 6), the Westlake proposal would required 12% of the annual water available in that part of the aquifer. The estimated drawdown at the perimeter of the cone is only approximately 3 cm (1.2 in) and in proximity to the well field at the centre of the drawdown cone it would be close to 3 m (10 ft). At a distance of 1.6 km from the well field, the drawdown is about 0.6 m (2 feet). It is projected there would still be approximately 15 m (50 ft) of water bearing sand near the well head after pumping at a rate of 35.8 L/s for 20 years.

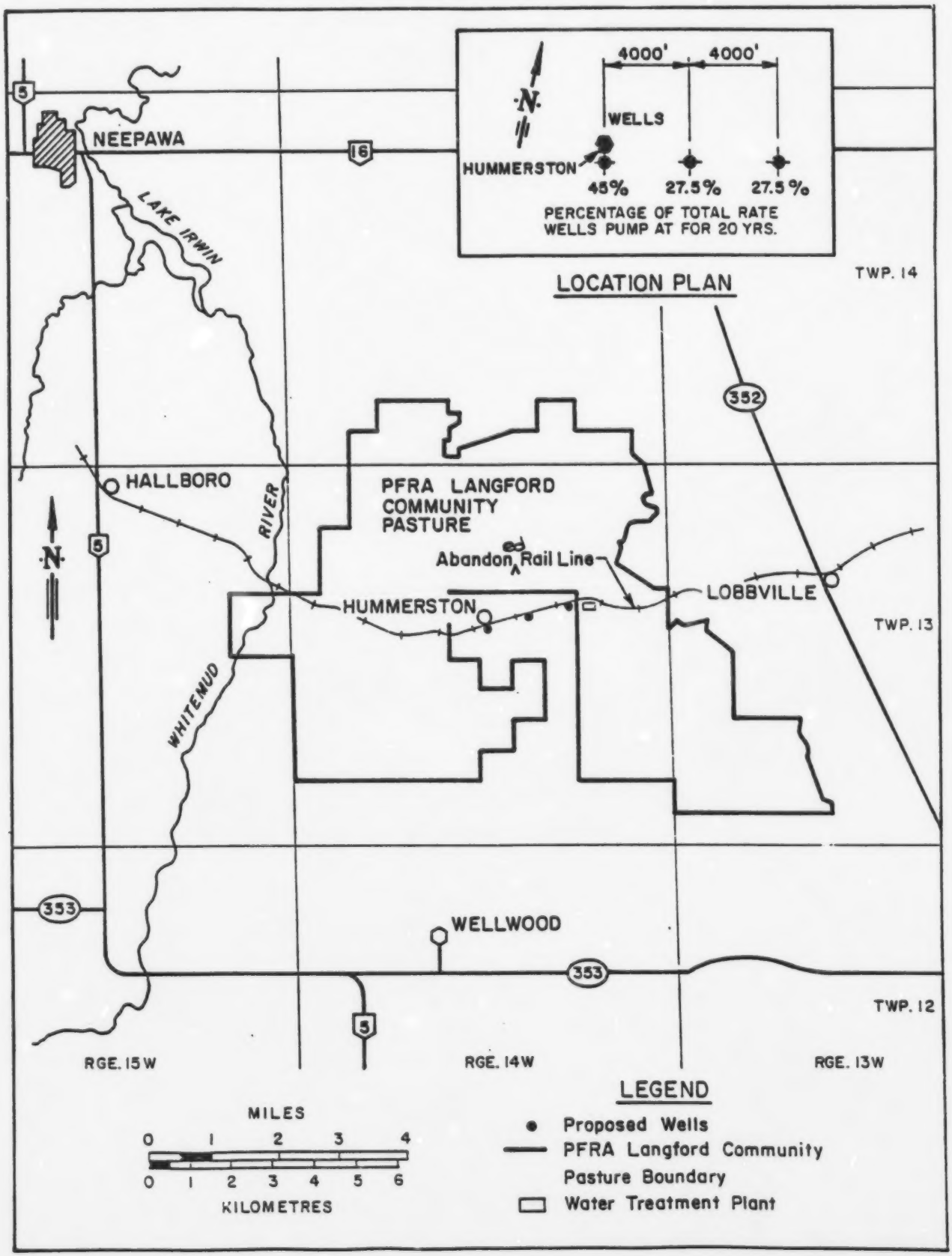
In terms of impacts on the aquifer, it is calculated that there will be a reduction of flow to the Helston Drain which drains from the aquifer towards the east to the Whitemud River, upstream from Gladstone.

It is projected that there would be an interception of a small percentage of the groundwater flow west towards the Whitemud River. Groundwater discharge at this location recharges the Whitemud River upstream of Lake Irwin. Lake Irwin is both a recreational Lake as well as the water supply source of the Town of Neepawa. The projected diversion of this groundwater flow would have negligible impact on Lake Irwin.

There are relatively few domestic wells located between the 0.3 m (1 ft) drawdown countour and the 3 cm (1.2 in) contour. Perhaps of greatest significance is the fact that a large percentage of the drawdown occurs within the area encompased by a community pasture.

FIGURE 4

Hummerston Well Field Location Plan



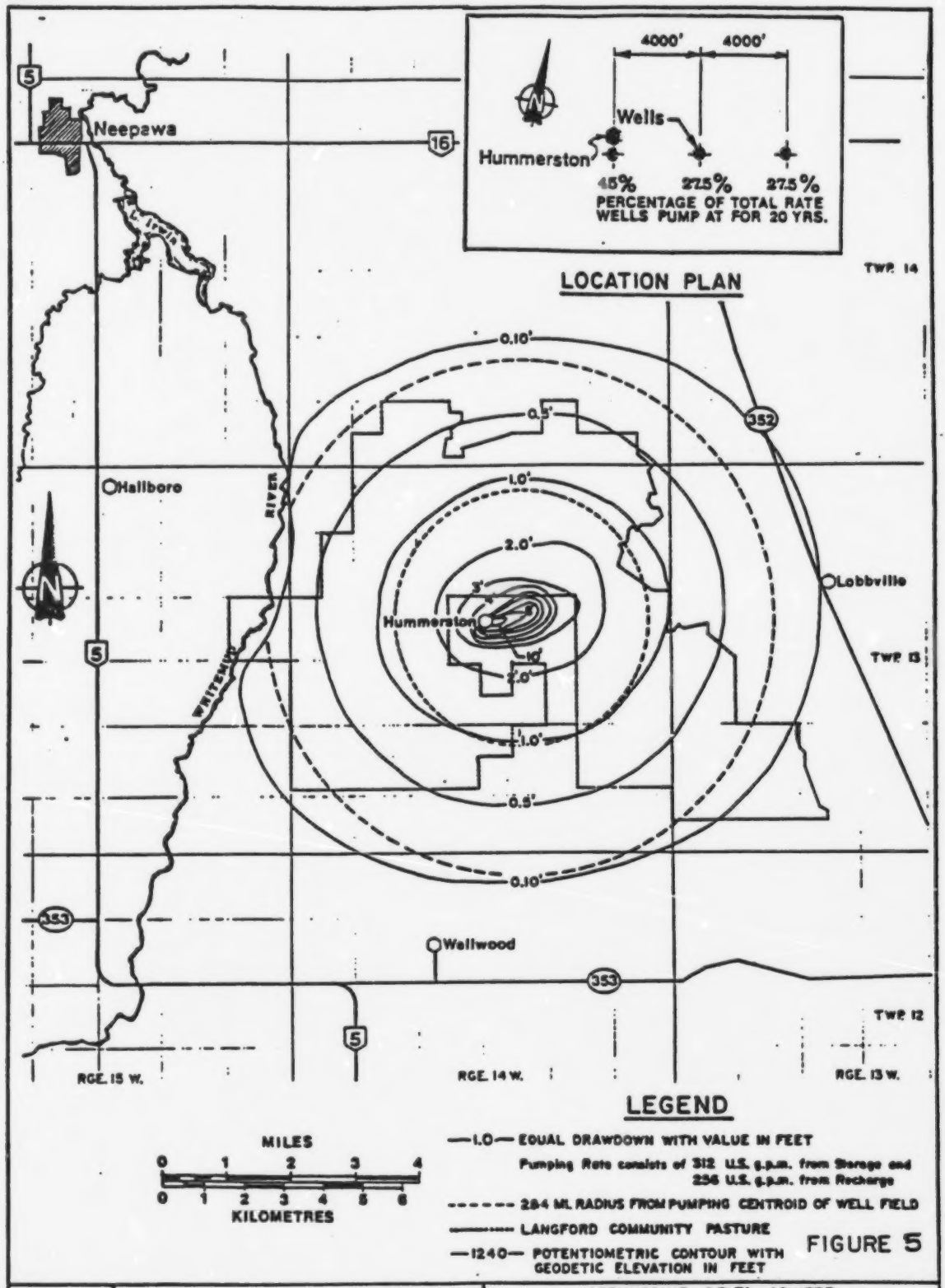
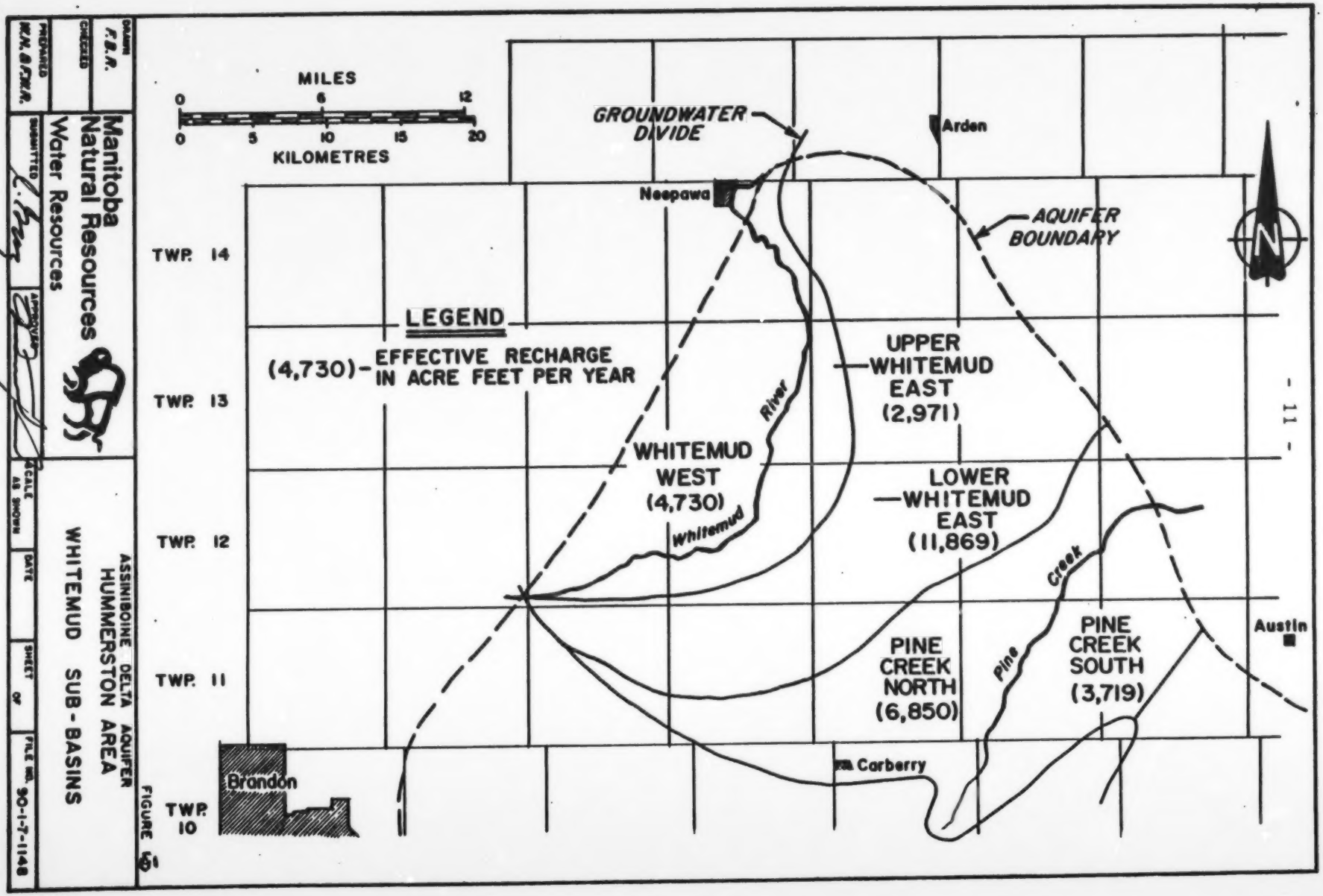


FIGURE 5

DRAWN F.B.R.	Manitoba Natural Resources	ASSINIBOINE DELTA AQUIFER
CHECKED	Water Resources	HUMMERSTON AREA
PREPARED W.H. & F.W.R.	SUBMITTED / APPROVED	DRAWDOWN FROM PUMPING 568 U.S. g.p.m. FOR 20 YEARS
	SCALE AS SHOWN / DATE / SHEET OF / FILE NO.	


MILES
0 6 12
0 5 10 15 20
KILOMETRES
GROUNDWATER DIVIDE
Arden
Neepawa
AQUIFER BOUNDARY
N
TWP. 14
TWP. 13
TWP. 12
TWP. 11
TWP. 10
LEGEND
(4,730) - EFFECTIVE RECHARGE IN ACRE FEET PER YEAR
UPPER WHITEMUD EAST (2,971)
WHITEMUD WEST (4,730)
LOWER WHITEMUD EAST (11,869)
PINE CREEK NORTH (6,850)
PINE CREEK SOUTH (3,719)
Whitemud River
Pine Creek
Austin
Carberry
Brandon
Manitoba Natural Resources
Water Resources
ASSINIBOINE DELTA AQUIFER
HUMMERSTON AREA
WHITEMUD SUB-BASINS
DRAWN F.B.R.
PREPARED W.N. & F.N.R.
CHECKED
SUBMITTED
APPROVED
SCALE AS SHOWN
DATE
SHEET OF
FILE NO. 90-1-7-1148
FIGURE 4b

PUBLIC PARTICIPATION & HEARINGS (continued)

The foregoing understanding of the aquifer, and the impacts of withdrawing water in the amount required to service the Westlake region, has resulted from years of measurement and study of the groundwater regime by hydro-geologists. Pumping tests of a well at the Hummerston site in the fall of 1988 added to this understanding.

In a socio-economic sense, somewhat more than $2.2 million of the project costs will benefit the Manitoba economy. It was estimated that governments and citizens in the drought area, that will be serviced by the proposed pipeline, spent an estimated $141,000 hauling water during 1988. This was thought to be a low approximation since the estimates include only those who applied for water hauling grants.

A series of questionnaires has been handed out during the informational open houses held in late May in Gladstone, Neepawa and Carberry. Of some 500 people in attendance, some 60% completed questionnaires. In the Westlake area, (Gladstone) the response was that water was needed. Residents located above the aquifer were concerned about the impacts of such a water supply proposal on the wells and dugouts and about groundwater management as a whole. Much of the concern was about the impacts of large scale irrigation projects on the aquifer.

A number of recommendations were included in the proposal document as follows:

- that the water supply proposal be licenced under the Environment Act.
- that the Manitoba Water Resources Branch implement a groundwater monitoring program, as recommended in a report by provincial hydrogeologist Mr. Frank Render, which would measure the water removed from the Assiniboine Delta Aquifer by the proposed project, the resulting drawdown, the water quality, and the reduction of water normally discharged to the Helston drain.
- that the results of the monitoring program be reported to the MWSB and any other interested party, particularly those located on the aquifer.
- that, in consultation with the residents of the aquifer area, an Assiniboine Delta Aquifer Advisory Committee be established to apprise area residents of new development proposal, aquifer monitoring results, water licencing activities, and, as well, provide a mechanism for input into the planning and management of the aquifer over the long term.
- that MWSB ensure that all residents be informed of progress made in implementing the Westlake proposal.

Mr. Allison responsed to a series of questions following his presentation.

PUBLIC PARTICIPATION & HEARINGS (continued)

- The groundwater formation would continue to support the existing land form without subsidence under the influence of water withdrawal from the underlying sand.

- Any other project contemplated in future entailing large water withdrawals from the aquifer would also require licencing.

- The pipeline was sized only for domestic and livestock needs and not irrigation. If there was capacity in the Westlake system to support irrigation, the cost of the water supply for this program would be prohibitive.

- Although Gladstone currently has an assured water supply, the treated water is often unacceptable because of the inability of the treatment plant to remove taste and odor compounds at the source. As well, a minimum 0.2 m^3/s (7 c.f.s.) must be released from Lake Irwin to ensure a water withdrawal at Gladstone. During the winter of 1988-89 the release had to be increased a further 0.1 m^3/s to assure Gladstone of a water supply source because of the channel losses.
- Both the water rights licence and the design of the Westlake Regional Water Supply system would prevent water withdrawal from the aquifer in an amount exceeding the amount stipulated 53.6 L/s (708 igpm).

A questioner noted that there were no domestic wells shown in the Lobbville area whereas there were quite a number of wells in that area. Mr. Allison conceded that the investigation conducted by the proponent underestimated the number of existing wells located within the drawdown cone of the proposed well field. The projection was however that the drawdown impacts in that area would be negligible (3 cm).

Another questioner from Wellwood felt that insufficient study had been done concerning the water supply withdrawal proposal; that one pump test of 72 hours was inadequate and that the withdrawn water during the pump test would have returned to the aquifer and masked some of the drawdown effect. In his view, the drawdown from the Hummerston well field could impact Wellwood. According to the projected drawdown curves, Wellwood is approximately 2 km (1.3 mi) from any drawdown influence from Hummerston. Aside from the Hummerston well field, the questioner was aware of a potential 8 quarter sections available for irrigation within 5 km (3 mi) of Wellwood. In summary, he felt that the EIA was biased towards the development of the water supply project.

Another questioner was interested in knowing what reparations would be made if it was discovered that a licenced proposal was impacting other nearby wells. The answer given was that the proponent causing the problem would have to modify their proposal or the licence could be withdrawn or measures would be required by the licencee to deepen the wells of those impacted.

PUBLIC PARTICIPATION & HEARINGS (continued)

Another individual questioned the influence of man made drains on the discharge of water from the aquifer. The response was that such drains could divert groundwater from the aquifer. The questioner felt that such drains could influence groundwater levels at those well locations near the edge of the aquifer.

In response to a number of questions, Mr. Allison noted that individuals with water supply problems could connect a water service to the Westlake project pipeline.

One questioner wanted a re-iteration of the impact of the Hummerston project on the water supply to Lake Irwin. It was stated in response that the impact would be insignificant.

Another questioner wondered what would prevent further water supply developments from utilizing the Assiniboine Delta Aquifer. The answer was that each development would have to be investigated and subsequently licenced. As well, if the proponents proposal were accepted, the input of an Advisory Committee, if established, would have to be considered.

In response to a question, it was stated that as far as utilizing Lake Irwin as a water supply source for the Westlake region, the reservoir was fully committed as a water supply for Neepawa as well as its use as a recreational water body.

Hydrogeologic Analysis

Mr. Frank Render, a groundwater engineer with the Manitoba Water Resources Branch of the Department of Natural Resources made his presentation at Carberry. He made a detailed presentation on the hydro-geology of the Assiniboine Delta aquifer, particularly that portion of the aquifer incorporating the Hummerston well field, which is the proposed water supply for the Westlake proposal.

He noted that the aquifer was unconfined - i.e. an aquifer whose upper surface is a saturated water zone in soil open to the atmosphere. The objective of the study undertaken by the Water Resources Branch was firstly to determine aquifer coefficients such as transmissivity, coefficient of storage and specific yield and secondly to simulate various development scenarios such as the Hummerston case.

In order to evaluate the aquifer structure and the amount of water in it and to establish how the aquifer system operates, 104 test holes were drilled and a number of holes that had been drilled in the sixties were re-opened. The drill cores also identified the soil removed from the column. The drilling program enabled the determination of the thickness of the aquifer. The aquifer is generally 30m (100 ft) thick in the middle with a thick zone in the north central area.

PUBLIC PARTICIPATION & HEARINGS (continued)

To analyze the aquifer system, the aquifer was divided into sub-basins (figure 6). Observation wells were sited in order to get a weighted average area for each well. Many of the wells have automatic recording devices. The saturated thickness of the aquifer can then be determined from the water level.

Recharge, the change of storage within the aquifer, and the direction of groundwater movement can be determined from measurements and observations. The records from one of the wells, presented as an example, showed the rise and fall of the water level in response to drought (a depression) and the restoration of the level with a good replenishment cycle. In order to assess water movement, pump testing along with observations have to be done. Apart from pump testing irrigation wells, a number of formal tests were done on wells drilled for that purpose.

Another important factor is the hydrologic budget of a system which takes into account precipitation, run-off, evapo-transpiration, soil moisture, irrigation return flow and outflow from the aquifer. Information available on the Upper Pine Creek enabled a determination that there is approximately 3 cm (0.1 ft) of effective recharge which is available to leave the system on a long term annual basis.

To all of this has to be added the human withdrawal, which is largely the irrigation units which currently remove 10,000 dam^3 (8000 acre-feet).

This total information permits an estimation of the volume of water available for development or stream flow from the aquifer system.

Groundwater levels were relatively low back in the 1960's but have now dropped to the lowest level on record. The Water Resources Branch has no evidence to show that the water level is receding due to irrigation use. Trees are known to be large users of groundwater associated with their evapo-transpiration cycle.

Hummerston is the location of the proposed well field to service the Westlake area. There is approximately 36m (120 ft) of sand at the site of the well field with a layer of silty clay 11m (36 ft) above the bottom. The country is rough bush with an irregular rolling terrain. Aside from the well field itself, which is located on farm land, the surrounding land is rough pasture land (PFRA Langford Pasture). South and east of the well field is the Helston Drain which incises the upland area and drains a portion of the aquifer to the lower Whitemud River through Lobbville.

Given that the well field at Hummerston will be withdrawing water at an average rate of 35.8 L/s (473 igpm) for 20 years the aquifer storage will yield approximately 20 L/s (263 igpm) and 16 L/s (210 igpm) will come from recharge. This will result in a cone of influence around the well field of 16.7 million m^2 (180,000,000 ft^2) after 20 years (if weather conditions continue as in the previous 20 years). As the cone of influence expands it will draw more and more water from replenishment until eventually all of its

PUBLIC PARTICIPATION & HEARINGS (continued)

water comes from long term average replenishment. Drawdown would be 4m (13 ft) at a distance of 12m (40 ft) from the centroid; .6m (2 ft) at a distance of 2.4 km (1.5 mi); .3m (1 ft) at a distance of 5 km (3 mi) and 3 cm (0.1 ft) at a distance of 8 km (5 mi).

There would be some change in the flow network of the groundwater. Approximately 62 dam^3 (50 acre-feet) of groundwater would be subtracted from the upper Whitemud River (groundwater flow that recharges Lake Irwin) as a result of the Hummerston well field of a total of 3650 dam^3 (2971 acre-feet). Recharge water for the well field will be intercepted from the flow to the upper reaches of the Helston Drain. The total flow to the drain is estimated at 1050 dam^3 (849 acre-feet). Approximately 1/2 of the flow will be intercepted which means that there will still be flow in the drain likely restricted to spring and autumn seasons.

Under average conditions, only 1150 dam^3 (935 acre-feet) will be removed from the sub-basin that contains an estimated 14,600 dam^3 (11,869 acre-feet).

Mr. Render outlined his recommendations for monitoring the aquifer systems operation, including the placement of an additional 8 observation wells in addition to the 3 currently in place; a system of measuring the outflow through the Upper Helston Drain as well as an observation well at the Langford Pasture Slough; placement of an automatic rainfall recorder near the centroid as well as a snow water station; soil monitoring to be undertaken at 3 locations; and a scheduled water quality survey of the supply wells for major ions, heavy metals and pesticides.

In response to a question from a farm irrigator, Mr. Render indicated that, under the worst conditions, the cone of influence of an irrigation well would not exceed .8 kms (1/2 mile). Once irrigation concludes, replenishment water would return to the cone.

In response to another question he said that in the event that all of the sustainable yield of the aquifer were utilized, surface water discharge could be cut-off.

Mr. C. MacInnes a consulting engineer with Unies Ltd., had prepared a report for the Assiniboine Delta Aquifer Protection Association on the operation of the aquifer. At the hearing he made further comment following Mr. Frank Render's explanation of his analysis of the aquifer, his operational model-based prediction of the aquifer system network flows, and the effect of the Westlake water supply proposal.

Mr. MacInnes felt that in the hydrologic cycle there was a component of surface run-off and therefore the groundwater recharge component was being overestimated by the Water Resources Branch. In his view, the sustainable yield of the aquifer should be determined more precisely. This is an important consideration for the long term plan for the use of the aquifer for the benefit of the entire area.

PUBLIC PARTICIPATION & HEARINGS (continued)

In response, Mr. Render noted that the usual practice would be to utilize the observation from a monitoring well which is in the order of 9cm (3.5 in) in place of 3cm (1.2 in) that was used in the calculation.

Water Licencing

Mr. Dan Sie, a Water Rights hydrogeologist with the Water Resources Branch of the Department of Natural Resources also made a presentation.

He pointed out that all rights to the use or diversion of water in the Province of Manitoba are vested in the Province. The Crown is the owner of the resource.

The Westlake application has been evaluated carefully to ensure that over allocation of water will not occur. He stated that the sustainable yield of the entire aquifer was approximately 88,500 dam^3 (72,000 acre-feet). There are 75 projects licenced from the aquifer with an allotment of 16,000 dam^3 (13,000 acre-feet). There are an additional 21 new applications proposed with a further allotment of 5500 dam^3 (4500 acre-feet). The unlicenced domestic use of the aquifer is estimated at 1200 dam^3 (1000 acre-feet) and the farm use at 1200 dam^3 (1000 acre-feet).

Water rights licencing takes place in stages. It is first determined whether groundwater is available. Next, impacts on neighboring wells are assessed and recommendations made to safeguard neighboring wells. As a matter of interest, there are irrigators on adjacent quarter sections and the systems do not interfere with each other when operating. Mr. Sie noted that he had evaluated over 90% of the applications for irrigation.

On a number of smaller aquifers in the Province reservations have been applied to prohibit further irrigation use.

The licence does not include any condition to protect the groundwater from contamination. With regard to groundwater contamination by pesticides and fertilizers, the concern would be in relation to over-irrigation where the water leaches below the root zone of the plants. Mr. Render had commented earlier that the late Frank Penkava, an agricultural engineer and irrigation specialist with the University of Manitoba had indicated that in most cases, irrigation water was supplied to fulfill the needs of the crop with no surplus which would return to the groundwater by downward leaching.

Mr. Tom Baron, an irrigator located on the aquifer pointed out that for economic reasons most farmers apply fertilizers in an incremental way to prevent waste and that herbicides are not used indiscriminantly.

Position of the Area Residents

It should be noted that the residents views were in two separate categories: (a) those who live on the Assiniboine Delta Aquifer and believe

PUBLIC PARTICIPATION & HEARINGS (continued)

that the Westlake Project and other large water withdrawal projects will reduce or eliminate the water currently available to them; and (b) those residents from the Westlake region who are looking for a good quality, cost effective, and assured supply of water. The proposal under consideration states that technical evaluations indicate that such water originates from the Assiniboine Delta Aquifer and that the tapping of this resource would provide the best choice of the alternatives considered in the shortest possible time.

Carberry

Mrs. Darlene Perrett a livestock farmer near Lobbville, stated a concern that the reduction of flow from the Helston Drain, as a result of the project, will prejudice their livestock that depend on water from that source. The proponent had indicated an expected reduction of 50% from 1050 dam^3 (849 acre feet) per year to that drain through diversion from the aquifer by the Westlake water supply proposal. They would like to be compensated for this reduction. If the flow of the springs accruing to the Helston drain will be reduced, is it not reasonable to expect that the domestic wells in that area will also be lowered by the project?

It is their belief that the Firdale Dam would be a better alternative.

Mrs. Jeanette Henderson from Edrans expressed concern about withdrawal of water from the aquifer to service the Westlake project. In her view, the aquifer was already experiencing shortages as reflected by a recent need to deepen wells. The Edrans area like Lobbville is close to the edge of the aquifer. Most of the wells in the area are large diameter wells. With overuse, the perimeter of the aquifer will be affected first. She drew attention to a large aquifer in the Nebraska area that has been dewatered to the extent that it is no longer feasible to withdraw water.

Mrs. Henderson pointed at the use of Lake Manitoba or Pine Creek as logical and safe choices as a water supply in place of using the aquifer. A dam at Firdale would utilize water from the aquifer and not endanger the water in storage in the aquifer. In the event that the aquifer was dewatered, residents on the aquifer would likely have to be supplied from Lake Manitoba.

Mrs. Henderson lacked assurance that water rights licencing works very well. In her opinion, licence recipients withdraw virtually unlimited amounts of water.

Mr. Graham Henderson representing the Rural Municipality of North Cypress resisted the intention of establishing a well field on the aquifer and suggested, as an alternative, the use of a dam on Pine Creek to trap both run off and the aquifer discharge.

Their concern is that should the aquifer begin to fail, the major employer in the area, Carnation Foods would be the first to lose their water rights. Tampering with the groundwater may also impact vegetation on the surface, which is very fragile.

CARBERRY HEARING PARTICIPANTS (continued)

It is their belief that studies of the aquifer undertaken thus far are incomplete.

Councillor Stuart Briese of the Rural Municipality of Langford spoke on behalf of both the council and himself. Council gave P.F.R.A. permission to drill a test well near Hummerston but not for permanent use to withdraw water from the area. Council have reservations about a well field near Hummerston. Council feel that such a well field would have an adverse effect on the water table and groundwater availability to the Whitemud River.

There are approximately 1/3 of the residents in the Rural Municipality located north and west of the Brookdale drain and along PTH 16 east of Neepawa that have water problems and therefore Council have difficulty justifying approval of exportation of water out of the municipality. Many of these residents must haul water from Neepawa. A number of residences of the R.M. are located along the fringe area of the aquifer and would be impacted first in the event of drawdown of the water table.

The R.M. also have the view that the R.M. of Westbourne have some responsibility for their current water shortage by virtue of drainage programs.

Council feel that the development of a surface water supply at Firdale on the Pine Creek would have a number of positive effects for the area in terms of a water supply for the Westlake region as well as wildlife, recreational and irrigation benefits.

Mr. William Burch spoke on behalf of the Assiniboine Delta Aquifer Protection Association (ADAPA) an organization formed about a year ago and formalized within the past 6 months. The organization was formed because of a concern that, under the influence of large water use, water levels would decline. The Westlake project was such a large project. The Association members see analogies to major aquifers throughout the United States that have dried up.

They believe that alternative sources of water are available to the residents in the Westlake region.

Mr. Charles Turner of Wellwood expressed concern for both the quality and quantity of the aquifer if excessive pumping by commercial and irrigation interests continue. There was already concern with water rights licences that are being abused. The introduction of pesticides is a primary concern.

In his view, there are too many assumptions associated with the Westlake project. The water table at his residence near Wellwood had dropped .75 m (2.5 ft) this past year. He feels that the project should be placed on hold since it is going to interfere with the use of a natural resource that will prejudice its use by the residents.

Mrs. Eileen Downey, who resides in the Wellwood district 11 km (7 mi) south of the well head, expressed concern that the project would lower their water supply. The Downey's are dryland farmers and feel that irrigation has been overdeveloped. The concern is not only with the Westlake

water supply proposal, which is the equivalent of 8 to 10 centre pivots, but with the cumulative effect of the project and irrigators. Some of the spring bogs on their property, which are used for livestock watering, have dropped 0.75m (2.5 ft) since 1981. This also impacts grassland production.

In her view there have been insufficient studies and that Water Resources are experimenting in the absence of sufficient data. A complete and independent environmental impact study should be undertaken before any large volume use from the aquifer is permitted.

Another source of water should be found for Westlake.

Mr. Ralph Oliver spoke on behalf of a local crop management club. For potato growers, two of the issues that relate to the groundwater are the ever increasing quality requirements imposed by the processer and cost efficiencies. Their members are licenced users of the aquifer.

They have a concern with the uneasiness in the community over the development of the water resource. This is generated by a lack of a long term locally accepted plan for the aquifer. The Westlake project is an example of this planning lack. The proponents did not undertake any consultation with the local governments. Although the Province is in the process of developing a water strategy, the Westlake project appears to be an example of a quick and cheap solution to a problem without any understanding of a long term developmental strategy.

There is a need to know which areas and interests are entitled to this water. Water development on the aquifer in terms of irrigated agriculture and food processing are a lower priority under water rights licencing than domestic and municipal use.

New production contracts with Carnation Foods require that crops be irrigated to improve the quality of the product. The Company has a target of 65% irrigated production supply whereas currently the level is 20%. The return for irrigated acres exceeds that of dryland by an average of $741/ha ($300/acre). Based on a production level of 4450 ha (11,000 acres) of potatoes produced in the Carberry area, that represents a potential $3.3 million additionally that could be generated annually with irrigation. Because of the recent drought, Carnation contracted 13,650 tonnes (15,000 tons) of potatoes to Alberta farmers last year.

The members of the Crop Management club recommend a dam on Pine Creek as a water source for the Westlake project.

In response to questions, Mr. Oliver indicated that the water use of the Westlake project would be the equivalent of 15 centre pivot irrigation units. A centre pivot unit covers a quarter section.

Mr. Dan Sie, a hydrogeologist with the Water Rights Licencing group pointed out that the Westlake project was equivalent to 10 centre pivots.

CARBERRY HEARING PARTICIPANTS

Based upon drawdown information at a nearby well, Mr. Oliver felt that his irrigation unit was not impacting the aquifer.

Mr. Art Sear, Mayor of the Town of Carberry presented a brief. A main concern of the town is that additional water supply projects will follow in the event that the Westlake project is approved. In the event that the drawdown projections are exceeded, will the amount of withdrawal be moderated or the well shut down if considered necessary?

The Carnation potato processing plant employs 400 people directly as well as farmers involved in potato production. It would seem that the development of similar industries in the area would prove more beneficial to the welfare of the area than exporting the water away from the aquifer in every direction.

Part of the water supply used on land over the aquifer is also returned to the aquifer whereas no water is returned when water is exported.

Carberry council favor the development of the Pirdale dam to supply the Westlake project.

Mr. Tom Baron spoke on behalf of the Assiniboine Delta Aquifer Protection Association. The Association feel that they have the responsibility to be "keepers" of the aquifer - that is to make sure that the aquifer is used in a just and fair manner.

Mr. Baron talked about man made drainage problems on the east side of the aquifer that may be causing drawdown on the aquifer.

His Association had retained a consultant engineering firm to evaluate the premises of the hydrogeological studies of the aquifer undertaken by the Manitoba Water Resources Branch. The consultant firm, Unies Ltd., questions the method used to estimate the aquifer recharge which is based on water flow data from the Upper Pine Creek basin. The proponent assumes that there is no runoff component to recharge and that recharge rates in the Upper Pine Creek can be transposed to a different type of area on the aquifer near Hummerston.

The Association would like to see further verification of the aquifer capacity before its use by the Westlake project is permitted. The Association would also like to point out that the least expensive project is not necessarily the best one.

The Westlake project has been designed for current water demands for domestic and livestock uses. Other uses or needs are not considered. A surface reservoir alternative may have additional benefits which would defray the additional costs of such an alternative.

CARBERRY HEARING PARTICIPANTS (continued)

There needs to be a careful investigation of the long term water supply and demand in the area in order to make the best use of the Assiniboine Delta Aquifer. Local input would be an important segment of this study. Development of the aquifer has implications for both the residents located on the aquifer as well as those off the aquifer along Pine Creek, the Whitemud and Assiniboine River.

Mr. Mel Chambers, Councillor of the Town of Neepawa spoke on behalf of the Town. He noted that the Town is fortunate to be the recipients of a water supply source that is provided primarily by the outflow from the aquifer. Not only domestic but industrial needs are supplied as witnessed by the establishment of the Springhill Hog Processing operation built 3 years ago.

Council believes that a well field established on the aquifer near Hummerston is the best proposal to supply the immediate needs of the Westlake regional project with water. However, in the long term, feasibility studies should continue on long term solutions such as utilization of Lake Manitoba.

In the event that the Lake Irwin supply was adversely affected by a well field at Hummerston, a compensation package including an alternate water supply should be provided to Neepawa by the province. The well field at Hummerston should be carefully monitored and should be closed down to protect the aquifer in the event of adverse effects.

The Town of Neepawa recommends that a management team consisting of municipal councillors, members at large and resource personnel from government be established to oversee the management of the well field, the entire aquifer and future proposals.

In response to this presentation Mr. Allison of PFRA reiterated that the reduction of flow to the Upper Whitemud East sub-basin of the aquifer from the drawdown of the Hummerston well field would be less than 100 dam^3 (123 acre-feet) whereas the flow past the Lake Irwin dam the year is about 17,000 dam^3 (20,900 acre-feet) most of which is surface run-off occurring during the spring of the year.

In the view of Mr. Briese, councillor from the R.M. of Langford, there was very little contribution from surface run-off this past spring towards filling the reservoir at Neepawa but yet Lake Irwin filled to the top of the spillway.

Mrs. Shirley Witherspoon, a farm resident located 5 km (3 mi) north of Carberry, spoke next. The Witherspoons operate a farm growing cereals, oil seeds and peas. They have a large herd of cattle and a farrow to hog finishing operation.

At a number of locations throughout the farmstead, there has been a necessity over a 41 year period to continue lowering sandpoints. At one location, a sandpoint at 5.5 m (18 ft) had to be dropped to 11 m (32 ft). At a location 11 km (7 mi) west on a piece of property that has been in the family for 95 years, a good sized lake has dried up. A number of other

CARBERRY HEARING PARTICIPANTS (continued)

sloughs in the area were dry in the spring of 1988. In the view of Mrs. Witherspoon, the water level has dropped 3-3.6 m (10-12 ft) in the past 40-50 years. This reduction in water level has to be due to increased water useage in households, increased number of livestock — both of which require an increased water supply — and also the Carnation plant. Coupled with this has been reduced snowfall. Part of the Westlake water shortage is also due to extensive municipal drainage.

There is also extensive irrigation in the area. Water Resources have never conferred with Witherspoons about irrigators who have applied for a licence and there are a number in their area. Council of the municipality have never questioned the licencing of irrigators.

The Westlake project would hasten the depletion of water from the aquifer. The answer for the Westlake project is a surface reservoir.

Mr. Allan Reynolds of the Rural Municipality of North Cypress was the next speaker. He expressed the view that a pipeline to convey water from the aquifer region would be precedent setting. The aquifer seems to have been lowered throughout the years. Planning should be done before large volume uses are permitted.

Mr. Peter Hunter councillor from the Rural Municipality of Lansdowne stated that Lansdowne is located on the east side of the aquifer and he expressed concern for upwards of 36 households that will be affected by the lowering of the streams and wells east of Hummerston. A reduction of 50% in the Helston drain will be critical to cattle watering particularly in summer. A reduction in the streams and ditches will also effect wildlife.

Mr. Hunter also felt that the R.M. of Westbourne had contributed to their own problem by excessive surface drainage to bring more land under cultivation and to get on the land earlier in the spring.

The Westlake project should be supplied from Lake Manitoba.

Mr. H.R. Bjarnarson, Reeve of the R.M. of Westbourne responded to the charges made concerning indiscriminate municipal drainage. Many of the drains were placed to relieve flows from upstream jurisdictions most of which are provincial drains. Mr. Bjarnarson felt that some of the drainage surrounding the aquifer was impacting on the water levels in the aquifer.

The Westlake group have been promoting the replenishment of the aquifer by the creation of small dams and reservoirs in the Langford pasture.

Mr. Ken Mitchell, a farmer from the Brookdale area on the aquifer, stated that the groundwater table in his area has been receding in the last 2 or 3 years. It has been necessary to drop long time sand points .75 m (2.5 ft). Many of the spring bogs which reflect groundwater discharge have now dried up or have been drained to the creeks.

CARBERRY HEARING PARTICIPANTS (continued)

It is the feeling of Mr. Mitchell that not enough is known about the effects of large water projects on the aquifer.

Gladstone

At the reconvention of the hearing in Gladstone, Mr. Erv Griffin of the MWSB again introduced the proposal on behalf of the proponents. He was followed by Mr. Stan Rainkie, Chairman of the Westlake Water Association and Mr. Elliott Allison of the PFRA, who gave an abbreviated repetition of his presentation at Carberry. After consultation by the Chairperson with all present it was agreed that Mr. Frank Render, hydrogeologist with the Water Resources Branch of the Department of Natural Resources, and a member of the proponents team, would not repeat the Carberry presentation of his analysis of the Assiniboine Delta Aquifer, due to the lateness of the hour.

Mr. Stan Rainkie, Chairman of the Westlake Water Association and a Councillor from the R.M. of Westbourne spoke in further detail about the importance of the project to the area that he represented, being the south west corner of the municipality and the area north of PTH 16.

Last year some producers began hauling water as early as June. The hauling of water has been necessary on average about every 5 years. There are 4 community wells in the Rural Municipality of Westbourne and 1 each in the R.M.'s of Glenella and Portage. The well in Glenella went dry in early fall. A second well was installed at Ogilvie. Beyond the community wells, there is the Neepawa water supply which is over a 100 km (62 mi) round trip from Plumas.

Much of the marginal land in the northern part of the municipality has been converted to mixed or livestock farms and the farmers continue to seek new water supply sources. Fifty new dugouts were built in and around the area in 1988, with many nearly dry by early winter of 1988. Wells were dug, enlarged or modified but in many cases the well went dry. Part of the problem of dugouts in the Plumas area is their inability to hold water because of permeable soils. Some measures are being taken to withhold water in drainage ditches.

A proposed regional pipeline would service all of the needs of a farmstead during a drought period; however, livestock would continue to be watered from local wells and dugouts wherever possible. Dugout recharging is difficult in the north portion of the municipality since the most reliable water source is the Whitemud River which is some 50 km (31 mi) distant.

GLADSTONE HEARING PARTICIPANTS (continued)

A considerable amount of money has been spent by farmers and both levels of government in the past few years dealing with the water supply question. If the water situation shows no improvement, farmers will be compelled to reduce breeding stock which will mean that the marginal land will remain idle or efforts will be made to revert to crops. This would impose not only economic hardships on farmers but also the communities and the municipality.

The Westlake regional project is a necessity and, based on studies conducted by governments, the well field at Hummerston on the aquifer would seem to be the best alternative. Like the residents residing over the aquifer, the Westlake residents would want to ensure that the aquifer was well managed.

The Westlake Water Association would also like to see studies on a Pine Creek dam continued to ensure that there is a guaranteed water supply into the future.

In response, Mr. Don Simpson, a farmer near Brookdale pointed out that farmers in the Brookdale area in the R.M. of Langford also have to haul water on a basis very similar to that of Westbourne.

Mrs. Catherine Mowat from Gladstone made a presentation. The water spring on her son's farm, which she described as being part of the aquifer, failed last fall for the first time in 100 years. He had to haul water 15 km (9.5 mi) from Neepawa.

She also felt that there was no control on field irrigation since all of the water had been withdrawn from Pine Creek last year.

Mr. Brian Crammond, a farmer near Lobbville, drew attention to concerns about the proposed Hummerston well field. It is his belief that the drawdown from the project's well field will effect both the local wells and the creeks. Wells which have never been dry have recently dried up, which he associates with the large irrigators use of the aquifer.

Mr. Elliott Allison stated that Lobbville was located at the edge of the aquifer where the thickness of the water bearing sand was limited, which condition would also naturally limit a ground water supply. Mr. Allison pointed out that impacts from the Hummerston well field would be identified based on measurements taken at observation wells located in each of the major compass directions from the project's well field water supply. Results of this monitoring program would be available to anyone with an interest. If the drawdown was measurably more than projected, or if creeks dried up, there would be a good case to ask the project operator to correct that situation.

Mayor Stephanie Karaz of the Town of Gladstone, speaking in support of the Westlake proposal, told the hearing that the present Town water supply from the Whitemud River cannot be adequately treated to provide a good quality drinking water. Many people in Town currently haul water or have installed water purifiers.

GLADSTONE HEARING PARTICIPANTS (continued)

There is also a concern that rural residents who utilize the community as a buying centre have an adequate supply of water for livestock and household purposes.

Mr. Don Smith, a farmer from the Westlake region spoke about water shortages and measures that he has undertaken to correct them such as digging a new well and enlarging his dugout at a cost of $8700 without finding a long term solution. The outcome was that by January he had to begin hauling water from Ogilvie, a round trip distance of 45 km (28 mi).

A pipeline to the Westlake area would solve the problem.

Mr. Bruno Tonn, told of constructing a shallow well in 1965 at his farm some 4 km (2.5 mi) from Plumas. The water became unfit for human consumption and in 1975, he began hauling water a distance of 110 km (70 mi) at a cost of $39 per 5700 L. (1250 i.g.).

He noted that he was one of many in that area required to haul water.

Mr. Harold Flatt, a Councillor for the Village of Plumas noted that the village have been seeking a water supply of good quality for 30 years. They have been advised that the local groundwater supply is not adequate or is of poor quality. Shallows wells in the Village generally dry up in fall or winter. From October 1988 to May 1989, some 150 loads of water have been hauled to the community at $400 per load by a contractor.

A 12 unit senior housing project is being planned for Plumas this summer. Without a pipeline, this facility will have to be supplied by water hauling.

There is also concern for the reservoir used for fire fighting which is currently about one half normal volume.

Mrs. Norah Turner from Wellwood spoke next. As a representative from the aquifer area, she asked for assurance that a decision to use the aquifer to supply the Westlake project would not be undertaken hurriedly.

Mrs. Turner also had a concern for the large scale irrigation projects. She suggested a shut down on irrigation licences for 1 year. In her view, there are both problems of quantity and quality associated with the irrigation tracts.

Provincial Departments

Mr. Larry Strachan representing the Environmental Management Division of the Department of Environment made a presentation to the Commission.

Mr. Strachan noted concerns that had been received from other Departments which had been circulated with copies of the EIA, including the following:

GLADSTONE HEARING PARTICIPANTS (continued)

(a) impacts of the drawdown cone from the well field from a Class III waste disposal grounds located 4 km (2.5 mi) south of the well field.

(b) the handling and disposal of any sludge/backwash from the water treatment plant.

(c) impacts of the pipeline installation in areas sensitive to environmental disturbance.

(d) noise from pumping stations.

(e) impact on ground and surface water quality.

Mr. Allison responded to the Department's concerns. He noted that the Rural Municipality of Langford is currently conducting a study to relocate the waste disposal grounds.

Mr. Allison noted that the only water treatment contemplated, apart from disinfection, is iron and manganese removal and that backwash water wastes would be discharged to a pond or lagoon. The water would become recharge to the aquifer and the iron and manganese precipitate would be filtered by the upper soil column.

Since the pipeline is being constructed along a former railway right-of-way and along municipal right-of-ways, there should be no significant impacts on the environment. The Whitemud River pipeline crossing will be suspended from the bridge. The booster pumping stations are quite small and the noise should be negligible.

In considering the water supply alternatives for the Westlake project, Mr. Allison re-iterated that the principal criteria were cost, water quality, and impacts on the environment. With regard to the choice of the Hummerston proposal, there would not be adverse effects on water quality from the influence of the drawdown cone. In all cases, the use of the aquifer was superior to the use of a surface water source.

Mr. Allison stated that, in terms of other benefits, it is really only the high dam alternative at Firdale, at a cost of nearby 20 million dollars, that would have additional flood control and irrigation benefits and possible dam construction and water holding difficulties would require further investigation. In addition, all other alternatives would require considerably more time (years) for development and construction, whereas if approval to proceed is received in the near future, the Hummerston project, utilizing the Assiniboine Delta Aquifer could supply badly needed water to the Westlake area within a very short time.

Dr. N. S. Rihal, representing the Health Services Branch of the Department of Health, made a presentation. He felt that there should be no adverse health effects to anyone from the proposed project and a good quality water supply is a conducive factor for good public health.

DISCUSSION AND CONCLUSIONS

There is a clear need for an adequate water supply to service the Westlake area in Manitoba. The need was well reflected this past year when many of the area residents, particularly in the northern part of the R.M. of Westbourne, were forced to begin hauling water by June, 1988 to meet both household and livestock requirements. These measures were necessitated as a result of a drought. Both wells and dugouts dried up in spite of efforts to reconstruct or even renew these structures. The Commission learned that this area had been declared by PFRA as one of Manitoba's most serious drought prone areas.

At the hearings, a number of citizens from the area recounted a necessity to haul water on an average of one year in five. Both farmers and householders in the communities, as well as all levels of government, are currently spending much effort and money to secure water supplies, often with limited success. In many cases the water obtained was of marginal quality for human consumption.

The Commission also received testimony from residents in both of the R.M.'s of Langford and Lansdowne that water shortages were not unique to the R.M. of Westbourne. In spite of the fact that Lansdowne borders the Assiniboine Delta Aquifer on the east side and the northern portion of the aquifer is located in the R.M. of Langford, evidence presented indicated that sections of these municipalities experience water shortages.

P.F.R.A. and MWSB have proposed a regional pipeline to service the communities of Gladstone, Plumas and Glenella as well as a number of Hutterite colonies and a total of 700 farmsteads. It has been proposed that half of the farmsteads would be on line and the balance would be serviced from tank loading stations. The water supply source selected for the project was the Assiniboine Delta Aquifer.

The aquifer is located in an area of some 5200 km^2 (2000 mi^2) centred on Carberry. At almost any place in the aquifer a well could be drilled and a very useable water supply developed. The communities of Carberry and Glenboro utilize the aquifer. Most communities of that size in Manitoba have developed a centralized waterworks supply and treatment system. In Glenboro & Carberry there was need only to construct a wastewater collection and treatment system, since each home owner benefits from an individual well water supply from the aquifer. Neepawa, MacGregor and Austin are served indirectly by the aquifer which feeds Lakes Irwin and Jackson. The aquifer services other smaller communities such as Wellwood, Brookdale and Douglas as well as every farmstead and other residence.

A major industrial water user on the aquifer is Carnation Foods, which processes potatoes into fries and dehydrated products at a plant immediately south of Carberry. Water consumption ranges from 4.5 - 6.8 million L (1-1.5 million g) per day.

Another major use of the aquifer of recent origin is for large scale irrigation. The principal crops grown by irrigators are potatoes for seed or processing. More and more, Carnation Foods Ltd. at Carberry would seem to be

DISCUSSION AND CONCLUSIONS (continued)

encouraging growers farming from the area to convert farming operations to irrigation as a means of ensuring the supply and improving the quality of the product. It was estimated that 15% of the growers were farmers using irrigation; however, reference was given to the fact that a goal of the company is to have 65% of the production to be potatoes from irrigated acreage.

There are some 75 or 80 pivots that have been or are in the process of being licenced under the Manitoba Water Rights Act. If each producer withdrew his licenced portion of water, this would amount to 16,000 dam^3 (13,000 acre - feet) annually. The quantity actually used has been in fact closer to 8000 acre - feet. This compares with a maximum draft of 1700 dam^3 (1400 acre - feet) of water which is proposed to be licenced for annual withdrawal by the Westlake project.

Almost without exception, the residents living on the Assiniboine aquifer object to the export of water from the aquifer for the Westlake project. In their view, the proposal selected is considered to be short sighted and based strictly on economics. All concede that the Westlake region has a need for a dependable water supply, but most feel that the need could be satisfied by the development of a surface water source.

The PFRA in their assessment of alternatives points out that a dam would be costly and a surface water source would require extensive treatment which would increase the capital and operating costs. There would also be difficulty at times removing taste and odor producing compounds associated with excessive algae growth. This would be particularly true for a structure on Pine Creek at Firdale. The bottom sediments would be a source of nutrient enrichment for a number of years. Pine Creek is a site that has been investigated by the PFRA a number of times as a potential location for a dam and reservoir. The largest of 3 possible dams evaluated at this site would more than double the cost of the Westlake project. There are also a number of potential dam sites on the Whitemud River and Spring Creek which pose similar problems. Lake Manitoba is a possible surface water source but development costs would be high and chlorides in the treated water supply would exceed the Canadian Drinking Water Guidelines.

The proposed water supply from a well field on the aquifer at Hummerston has been estimated at a cost of approximately $8 million compared to a medium size dam at Firdale at $13 million and a high dam at $19 million. The high dam would provide both flood protection and would meet some irrigation demands. Further geotechnical and hydro geological studies are needed before a dam could be considered at Firdale. A major problem in the development of a water supply for the Westlake region is the need of a degree of urgency. The time that would be required to design and build such a project is an additional factor to the greater cost of developing and operating a water supply from a surface water source. Westlake has an imminent water shortage that requires an immediate solution. None of the other considered dam development alternatives would provide a supply of water to the Westlake area before a minimum time period of at least three years.

DISCUSSIONS AND CONCLUSIONS (continued)

The area of the Assiniboine Delta Aquifer is extensive, being some 5100 km^2 (2000 mi^2) ranging from Douglas in the west to Austin in the east; Glenboro in the south to Neepawa in the north. The aquifer is comprised of a number of sub-divisions as a function of discharge boundaries. These boundaries are identified by the local streams and rivers such as the Whitemud and Assiniboine Rivers and Epinette, Pine and Squirrel Creeks located within the region.

The well field to service the Westlake project was selected in the upper Whitemud east sub-basin some 16 km (10 mi) south east of Neepawa. The location is known as Hummerston which was at one time section on a CNR railway line, which is now abandoned. The well field is to consist of 3 wells located along the right-of-way of the railway and spaced at 1220 m (4000 ft) intervals from each other. The approximate extent of the drawdown cone, after 20 years of pumping at 35.8 L/s (473 igpm) from the well field, is 6 km (3.75 mi). This is the estimated periphery of the cone where the drawdown is only 3 cm (.1 ft). A 30 cm (1 ft) drawdown occurs 3 km (2 mi) from the centre of the drawdown cone. These projections are based on a knowledge and understanding of the aquifer gained over several decades by hydrogeologists with the Department of Natural Resources as well as by means of extensive pump tests conducted at a well site at Hummerston during the past fall. A significant portion of the drawdown cone occurs within a PFRA community pasture.

Half a dozen domestic wells will be within the 15 cm (1 ft) drawdown area. Testimony received at the hearing indicated that up to 30 wells had been overlooked in a survey undertaken by the Water Resources Branch to identify well locations in the area at a location near the eastern edge of the aquifer (in proximity to Lobbville).

The hydrogeologist from the Water Resources Branch, Mr. Frank Render, indicated that a 3 cm (.1 ft) drawdown which is predicted at a location near Lobbville could not be differentrated from normal water table fluctuations. Householders in this area have been experiencing water problems in the form of shortages which they ascribe to major users such as irrigators. The Westlake project is seen as another such use which will further compound the problem of water shortages.

It appears likely that the aquifer discharge from the lower Whitemud East sub-basin of the aquifer (this is the sub-basin in which the well field is located) to the Helston drain will be reduced by approximately 50%. This could have some impact on the watering of livestock in pastures along the lower Helston drain.

There was some concern about the diversion of water from the upper Whitemud East sub-basin of the aquifer. Groundwater discharge from this area assists in the recharge of Lake Irwin located at Neepawa. This is an important water body since it represents the water supply source for the community as well as being a local recreational amenity. The projections with regard to the diversion of flow from the Lake Irwin basin indicated that the losses would be negligible.

DISCUSSIONS AND CONCLUSIONS (continued)

The aquifer has been the subject of extensive study and monitoring by the Manitoba Water Resources Branch for many years in addition to a recent pumping test at the Hummerston site. Despite a lowering of wells and surface wetlands in recent years there is apparently no hydrogeological evidence that the large water users have caused the water shortage at this aquifer boundary area nor is there evidence that the Westlake project will contribute to a water shortage.

There were 25 briefs received from individuals and groups from the aquifer area and as many more speakers who objected to the Westlake aquifer project. The aquifer is the sole water supply in the area. Aside from normal household and farm needs it supports both the processor and producer of the major industry in the area - potato processing. There is no question that application for irrigation permits will increase. This would almost seem to be a definite commitment. However, there are many opposed to large scale irrigation projects. There were concerns that irrigation was significantly lowering the water table. There were reports of water levels in wells that had been declining over a period of decades. In other cases, the reports were of recent water table declines (within the past 5 to 10 years). There were also reports of spring bogs drying up and lake levels receding. The area mentioned most often was north to north west of Carberry. Water Resources personnel responsible for licencing under the Water Rights Act were satisfied that the drawdown cones created by the irrigation wells were restored following the irrigation season. There did not seem to be a good answer to the matter of reduced water table lowering wells and drying up lakes and spring bogs. This phenomena might be a combination of a series of years with less than average precipitation, drainage practices or higher water use.

The sustainable yield of an aquifer is the volume of water that can be removed from the aquifer without a permanent lowering of the water level. The Westlake project would represent only 2% of the sustainable yield of the aquifer. Perhaps as large a concern as any on the part of those residing on the aquifer was the precedent setting nature of the project. Since there appears to be a great deal of high quality water in the aquifer, this source might attract other large scale users. The residents are not very assured by the requirements to secure licences under the Environment and/or the Water Rights Act as a means of protecting the aquifer from other demands to supply water requirements outside the aquifer.

In conclusion the Commission believes that the proponents of the Westlake project should be able to withdraw an average 35.8 L/s (473 i.g.p.m.) from the Assiniboine Delta aquifer at the Hummerston location in the manner described using 3 wells spaced at 1220 m (4000 ft) without a significant adverse impact on the sustainable yield of the aquifer; however, those whose present water supply could be affected by the proposal, should be protected from any loss of their water requirements which may be determined to have resulted from the implementation of the proposal.

The Commission also believes that the Assiniboine Delta Aquifer is such a large, basic, and important resource to such a variety of interests over a substantial area of the Province, that a comprehensive management plant should be developed and implemented, and that there should be public participation in this process.

RECOMMENDATIONS

The Commission recommends that the Westlake Regional Water Supply proposal be licenced under Section 11 of the Environment Act with the following provisos.

1. that the proposal be licenced for a period of 20 years for a maximum discharge rate of 53.6 L/s (708 igpm) and an average discharge rate of 35.8 L/s (473 igpm).

2. that an Assiniboine Delta Aquifer Management Advisory Committee, including local representation, be appointed by the government; to keep local area residents informed of new development proposals, aquifer monitoring results, and water licencing activities; and to provide local input into aquifer planning and management over the long term.

2.(a) that appropriate government Departments and agencies immediately prepare an inventory of present aquifer water utilization, including residential, farm, and industrial users and the volumes used as well as water use and disposal practices. This information would provide a base of information for the Management Advisory Committee.

2.(b) that the Water Resources Branch investigate some of the concerns identified by residents living on the aquifer that were expressed at the hearing and also the concern raised by the consultant on behalf of the Aquifer Protection Association with respect to the factors used in estimating the aquifer recharge rate.

2.(c) that any investigation of the aquifer include water quality considerations including the impact of return flows from irrigation, drainage from livestock operations, and infiltration from community wastewater systems and underground and above ground petroleum storage tanks.

2.(d) that because of the importance of the aquifer as a basic resource to the region and the present concerns by many citizens over present use and allocation of the water, no further irrigation licences be approved pending the formation of the Management Advisory Committee and its consideration of management and water allocation policy.

3. that the MWSB keep local area residents informed of progress in implementing the Westlake Regional Water Supply Proposal.

RECOMMENDATIONS (continued)

4. that the Manitoba Department of Natural Resources implement a groundwater monitoring program to measure withdrawals from the aquifer drawdown and related impacts of the Westlake proposal at the Hummerston well site as follows:

   (a) One automatic water level recording well be established at the centroid of pumping; automatic recording observation wells at the 1.6 km (1 mi) radius and the 3.2 km (2 mi) radius from the centroid of pumping should be installed in each of the four major compass directions. In addition at least 2 automatic recording observation wells should be established near the edge of the aquifer close to Lobbville. Observation wells should be established before pumping commences.

   (b) That in order to assess the changes in groundwater discharge that may occur along the Helston Drain it is recommended that an observation well be sited adjacent to the Langford Pasture Slough and that a cut-throat flume metering station be established near where the drain leaves the aquifer.

   (c) That in order to determine the hydrologic budget of the well field an automatic rainfall recorder should be established at a suitable location near the pumping centroid of the well field. Similarly a snow water station should be established within the well field and observed near the end of March each year.

   (d) That in order to measure the changes in the water content of the soil between the ground surface and the top of the saturated zone three soil moisture monitoring sites should be established; one at the centroid of pumping, one near a project observation well at the two mile radius and one near observation well ADA 1 on the west side of the Whitemud River.

   (e) That the supply wells should be sampled for water chemical analyses covering all major ions, iron, manganese and fluoride once a month. Also the supply wells and the observation wells should be sampled for complete water chemical analyses covering all aspects of potable water, including pesticides and other pest control products and heavy metals, once a year.

5. that the results of this monitoring program be reported annually to MWSB, Department of Environment, and Department of Natural Resources and the Assiniboine Delta Aquifer Management Public Advisory Committee.

RECOMMENDATIONS (continued)

6. that serious investigations continue into the surface water supply alternatives in the event that there are serious negative impacts from the Hummerston well field or the Westlake Regional Water Supply Proposal must be expanded to meet growing needs.

7. that the waste disposal grounds in the R.M. of Langford located 4 km (2.5 mi) south of the Hummerston well field be relocated from the area of the drawdown cone.

8. that measures be taken to remediate any well impacted by the Hummerston well field of the Westlake Water Supply Proposal.

9. that in the event livestock watering is impacted by reduced flow caused by the Westlake water supply proposal along the Helston drain during the 20 year life of the licence, the proponent must make immediate provision for an alternate water supply to those adversely affected.

CONVERSION FACTORS

The following list represents the conversion factors used in this report.

Acre	x	2.47	=	ha
Acre-Foot	x	1.23	=	dam^3
Foot	x	.305	=	m
Imperial gallon per minute	x	.076	=	L/s
Inch	x	2.54	=	cm
Mile	x	1.6	=	km
Square Mile	x	2.56	=	km^2

APPENDIX A

LIST OF EXHIBITS

From the Town of Carberry Hearing

June 7 & 8, 1989

1. Mr. E. W. Allison, Environmental Studies Coordinator, Prairie Farm Rehabilitation Administration, Regina, Saskatchewan, Brief, (dated June 6, 1989).

1.A. Mr. E. W. Allison, Environmental Studies Coordinator, Prairie Farm Rehabilitation Administration, Regina, Saskatchewan, Questionnaires from Carberry Residents, (dated June 6, 1989).

1.B. Mr. E. W. Allison, Environmental Studies Coordinator, Prairie Farm Rehabilitation Administration, Regina, Saskatchewan, Open House Registrants and Questionnaires from Neepawa Residents, (dated May 31, 1989).

1.C. Mr. E. W. Allison, Environmental Studies Coordinator, Prairie Farm Rehabilitation Administration, Regina, Saskatchewan, Questionnaires from Gladstone & Plumas Residents, (dated June 6, 1989).

2. Mr. Erv Griffin, General Manager, Manitoba Water Services Board, Brief, (dated June 7, 1989).

3. Mr. Larry Strachan, P. Eng., Chief, Environmental Control Programs, Department of Environment, Brief, (dated June 7 to 9, 1989).

4. Westlake Water Association, Brief, (dated June 7, 1989).

5. Mayor Arthur H. Sear, Town of Carberry, Brief, (dated June 7, 1989).

6. Mr. Mel Chambers, Councillor for the Town of Neepawa, Brief, (dated June 7, 1989).

7. Mr. Mervin Drayson, Reeve for the R.M. of Langford, Brief, (dated June 7, 1989).

8. List of Residents, from the R.M. of Langford

9. Ms. Vinetta Hannaburg, Secretary-Treasurer for the R.M. of Langford, Brief, (dated March 28, 1989).

10. Mrs. Darlene Perrett, Resident from the Town of Neepawa, Brief.

11. Mr. Henderson, Brief

12. Mr. Garry Henderson, Councillor for the R.M. of Carberry, Brief, June 7, 1989.

13. Mr. Stuart Briese, Councillor for the R.M. of Langford, Property Ownership Map for the R.M. of Langford.

14. Mr. Charles Turner, Wellwood resident, Brief

15. Mr. Ralph Oliver, Carberry Potato Attentive Crop Management Club, Brief, (dated June 7, 1989).

16. Mrs. Eileen Downey, resident of Wellwood, Brief, (dated June 7, 1989.

17. Mrs. Shirley Witherspoon, Brief.

18. Council Members from the R.M. of Langford and the Town of Neepawa, Brief, (dated October 27, 1988).

19. Mr. Stuart Briese, Councillor for the R.M. of Langford, Brief, (dated June 7, 1989).

20. Mr. Allen Reynolds, resident of North Cypress, Brief.

21. Mr. Peter Hunter, Councillor for the R.M. of Lansdowne, Brief.

22. Assiniboine Delta Aquifer Protection Association, Brief, (dated May, 1989).

23. Mr. Ken Mitchell, resident of Brookdale, Brief.

24. Mr. Rainkie, Chairman, Westlake Water Association, Brief.

25. Mr. Dan Sie, Water Rights Geologist, Water Resources Branch, Department of Natural Resources, Brief.

APPENDIX B

LIST OF EXHIBITS

From the Town of Gladstone Hearing

June 8, 1989

1. Mrs. Nora Turner, Brief (dated June 8, 1989).

2. Westlake Water Association & R.M. of Westbourne, Brief.

2.A. Mr. Stan Rainkie, Chairman, Westlake Water Association, Briefs, (dated March 7, 1989, February 8, 1989, April 10, 1989, March 22, 1989).

3. Mr. Stan Rainkie, Chairman, Westlake Water Association, Photos

4. Mr. Stan Rainkie, Chairman, Westlake Water Association, Video Cassette.

5. Catherine Mowat, resident of Gladstone, Brief, (dated June 8, 1989).

6. Stephanie Karaz, Mayor of the Town of Gladstone, Brief & Resolution Form, (dated June 6, 1989).

7. Mr. Smith, Brief.

8. Mr. Bruno Tonn, Tonn Seeds, Plumas, Manitoba, Brief, (dated June 8, 1989).

9. Town of Plumas, Brief.

10. Mr. Erv Griffin, General Manager, Manitoba Water Services Board, Brief, (dated June 7, 1989).